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(54) **MOBILE TERMINAL HAVING FM TRANSMITTING MODULE**

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**Abstract**

The present invention relates to enabling users to listen to an audio signal with a high-quality sound conveniently by adding FM transmitting module to a mobile terminal having a built-in MP3 decoder to output music files decoded from an MP3 decoder through a radio speaker. The inventive mobile terminal having FM transmitting module, comprises FM transmitting module. An FM transmitting module included in the FM transmitting module according to the present invention FM modulates the audio signal, generated from the MP3 decoder to transmit it to radio band through a terminal transmit-receive antenna or an FM transmitting antenna. Thus, by adding an FM transmitting module to a mobile terminal having a built-in MP3 decoder to output music files decoded from an MP3 decoder through a radio speaker, users can listen to the audio signal generated from the mobile terminal conveniently and in a high-quality sound, as it is without having a separate cable or a connection device equipped.

**Representative Drawing**

FIG 2

**Index**

mobile terminal, MP3

## SPECIFICATION

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG 1 is a block diagram showing the constitution of a conventional mobile terminal having built-in MP3 decoder.

FIG 2 is a block diagram of a mobile terminal having an FM transmitting module according to the present invention.

#### \*DESCRIPTION OF NUMBERS FOR MAIN PARTS OF THE DRAWINGS\*

102, 202: mobile terminal

104, 204: baseband controller

108, 208: MP3 decoder

112, 212: FM file data memory

114, 214: radio transceiver

116, 216: terminal transmit-receive antenna

210: FM transmitting module

218: FM transmitting antenna

### DETAILED DESCRIPTION OF THE INVENTION

#### Purpose of the Invention

#### Field of the Invention and Description of the Related Art

The present invention relates to a mobile terminal, and more particularly, to a mobile terminal having a built-in MP3 player.

With the wide spread of mobile terminals, many teenagers have terminals. The makers of mobile terminals are now introducing mobile terminals coupled with MP3 players to meet the needs of teenagers. That is, downloading music file with MP3 format from computer through a serial communication port arranged in a mobile terminal to execute the downloaded MP3 file using MP3 decoder equipped in the terminal.

FIG 1 is a block diagram showing the constitution of a conventional mobile terminal having a built-in MP3 decoder.

As shown in FIG 1, a conventional mobile terminal(102) having an MP3 decoder includes a baseband controller(104), an MP3 decoder(108), a memory(112), a radio transceiver(114), a terminal transmit-receive antenna(116), an external output port(120), etc.

As an essential part of terminal operation, the baseband controller(104) includes a CPU and a memory device, a mobile station modem, etc. The baseband controller(104) controls the overall operations of the terminal, converts the received audio signal into digital data and executes modulating and regenerating process for transmitting and receiving data to radio band. Also it generates a certain audio signal by reading MP3 file data from an MP3 data storing memory(112) for MP3 play function to deliver them to an MP3 decoder(108) and decode.

The radio transceiver(114) which is a device for transmitting and receiving a signal to and from radio band either transmits by converting modulation signal, generated from the baseband controller(104), to a signal with a high frequency through the terminal transmit-receive antenna(116), or transmits it to a speaker or an earphone, etc. mounted in the terminal through an external output port(120). And also, it converts a signal, received through the terminal transmit-receive antenna(116), into a signal with a low frequency to deliver it to the baseband controller(104).

The MP3 data storing memory(112) is a storing device for storing MP3 file data downloaded to a terminal.

The MP3 decoder(108) decodes the MP3 file data, delivered through the baseband controller(104) to generate an audio signal and thus output through the external output port(120). The external output port(120) is connected with a speaker or an earphone, etc. disposed in a terminal.

The operation of the conventional mobile terminal having an MP3 decoder is described in detail as follows.

While the MP3 file data, downloaded through a serial communication port, are stored in an MP3 data storing memory(112), when the MP3 file play is ordered by manipulation of the user, the baseband controller(104) withdraws the corresponding file data from the MP3 data storing memory(112) to transmit them to the MP3 decoder(108).

The MP3 decoder(108) is inputted with MP3 file data, transmitted through the baseband

controller(104), and then decodes them to output through the external output port(120) by generating a certain audio signal.

But, said conventional mobile terminal has problems in that sound-quality is low because the played audio signal can only be outputted by a built-in speaker or earphone, etc., connected to the external output port, or putting on earphone cause inconvenience.

#### Technical Solution of the Invention

The purpose of the present invention is to enable listening to an audio signal with a high-quality sound conveniently by adding FM transmitting module to a mobile terminal having a built-in MP3 decoder to output music files decoded from an MP3 decoder through a radio speaker.

The mobile terminal having an FM transmitting module, according to the present invention comprises an FM transmitting module.

The FM transmitting module included in the FM transmitting module according to the present invention FM modulates the audio signal, generated from the MP3 decoder to transmit it to radio band through a terminal transmit-receive antenna or an FM transmitting antenna.

#### Constitution and Operation of the Invention

A preferred embodiment of the mobile terminal having an FM transmitting module according to the present invention is described as follows with reference to FIG 2. FIG 2 is a block diagram of the inventive mobile terminal having an FM transmitting module.

As shown in FIG 2, the inventive mobile terminal(202) includes a baseband controller(204), an MP3 decoder(208), a FM transmitting module(210), a memory(212), a radio transceiver(214), a terminal transmit-receive antenna(216), an external output port(220), etc.

As an essential part of terminal operation, the baseband controller(204) includes a CPU, a memory device, a mobile station modem, etc. The baseband controller(204) controls the overall operations of the terminal, converts the received audio signal into digital data and executes modulating and regenerating process for transmitting and receiving data to radio band. Also it generates a certain audio signal by reading MP3 file data from an MP3 data storing memory(212) for MP3 play function to deliver them to an MP3 decoder(208) and decode.

The radio transceiver(214) which is a device for transmitting and receiving a signal to and from radio band transmits by converting modulation signal, generated from the baseband controller(204), to a signal with a high frequency through the terminal transmit-receive antenna(216). And also, it converts a signal, received through the terminal transmit-receive antenna(216), into a signal with a low frequency to deliver it to the baseband controller(204).

The MP3 data storing memory(212) is a storing device for storing MP3 file data downloaded to a terminal.

The MP3 decoder(208) decodes the MP3 file data, delivered through the baseband controller(204) to generate an audio signal and thus output to an FM transmitting module(210) or output to a speaker or an earphone, etc. disposed in the terminal through the external output port(220).

The FM transmitting module(210) is inputted with an audio signal, outputted from the MP3 decoder(208) to FM modulate to a frequency band signal that can be received on the radio. The modulated signal in the FM transmitting module(210) is transmitted to radio band through an FM transmitting antenna(218).

The operation of the inventive mobile terminal having an FM transmitting module is described in detail as follows.

While the MP3 file data, downloaded through a serial communication port, are stored in an MP3 data storing memory(212), when the MP3 file play is ordered by manipulation of the user, the baseband controller(204) withdraws the corresponding file data from the MP3 data storing memory(212) to transmit them to the MP3 decoder(208).

The MP3 decoder(208) is inputted with MP3 file data, transmitted through the baseband controller(204) to decode them and output to the FM transmitting module(210) by generating a certain audio signal.

The FM transmitting module(210) is inputted with an audio signal, generated from the MP3 decoder(208) to FM modulate to a frequency band signal that can be received on the radio, and then transmits through the FM transmitting antenna(218). In FIG 2, the signal delivery route(222) between the FM transmitting module(210) and the terminal transmit-receive antenna(216) is a signal delivery route in the case of using the terminal transmit-receive antenna(216) without utilizing the FM transmitting antenna(218). Thus, without having a separate FM transmitting antenna(218), it can transmit an FM audio signal by using the terminal transmit-receive antenna(216), equipped in the terminal.

Through above mentioned process, a transmitted audio signal is received by radio and can be outputted through stereo speaker of radio.

### **Effect of the Invention**

Thus, by adding an FM transmitting module to a mobile terminal having a built-in MP3 decoder to output music files decoded from an MP3 decoder through a radio speaker, users can listen to the audio signal generated from the mobile terminal conveniently and in a high-quality sound, as it is without having a separate cable or a connection device equipped.

### **CLAIMS**

1. A mobile terminal having an MP3 decoder, comprising,
  - an FM transmitting module which FM modulates an audio signal, generated from the MP3 decoder to transmit it to radio band through a terminal transmit-receive antenna or an FM transmitting antenna.
2. The mobile terminal according to claim 1, which comprises,
  - a storing device for storing MP3 file data;
  - a MP3 decoder which generates a certain audio signal by decoding the MP3 file data to output it to a built-in speaker or earphone through an external output port;
  - a baseband controller which executes modulating and regenerating process of an audio signal, fetches the MP3 file data from the storing device and transmits to the MP3 decoder; and
  - a radio transceiver which converts a modulation signal, generated from the baseband controller, into a signal with a high frequency to transmit it through the terminal transmit-receive antenna, and converts a signal, received through the terminal transmit-receive antenna, into a signal with a low frequency to deliver it to the baseband controller.
3. The mobile terminal according to claim 1, wherein the frequency of FM modulated signal, generated by the FM transmitting module, has a frequency band which can be received on the radio.

FIGURES

FIG. 1

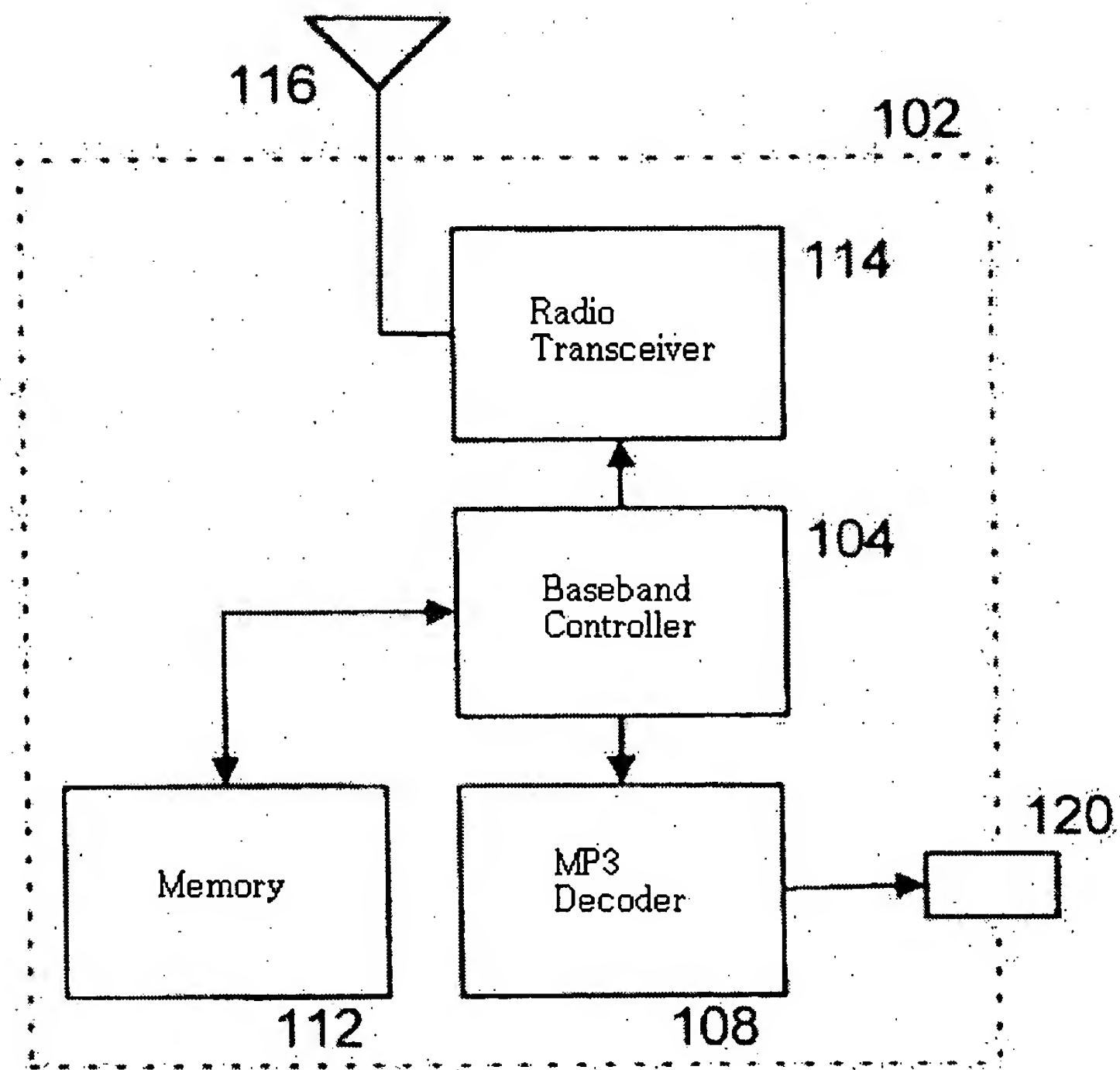


FIG. 2

